



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,487	11/20/2003	George G. Barclay	51854	8441

7590 09/08/2005

EDWARDS & ANGELL, LLP  
P.O. Box 9169  
Boston, MA 02209

EXAMINER
----------

ASHTON, ROSEMARY E

ART UNIT	PAPER NUMBER
----------	--------------

1752

DATE MAILED: 09/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/718,487	<b>Applicant(s)</b> BARCLAY ET AL.	
	<b>Examiner</b> Rosemary E. Ashton	<b>Art Unit</b> 1752	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 May 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4,5,22-24,52,54 and 61-71 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,22-24,52,54,61-71 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>5/11/05</u> . | 6) <input type="checkbox"/> Other: _____  |

Art Unit: 1752

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1,22,52 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In the amendment filed May 20, 2005 applicant amends the claims to remove from the underlying composition all mention of the resin, however, the claims still read on "comprising" before the canceled subject matter, thus, implying some limitation of the resin is missing.

### ***Claim Objections***

3. Claim 5 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 5 refers to the first resin of claim 1, however, claim 1 does not have a first resin.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

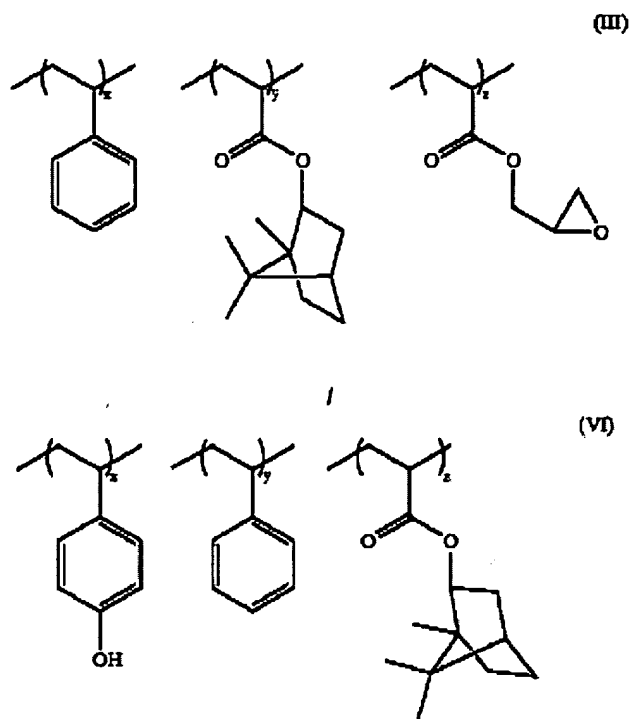
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Art Unit: 1752

7. Claims 1,2,4,5,22,23,24,52,62-71 rejected under 35 U.S.C. 103(a) as being unpatentable over Khojasteh et al patent application publication no. US 2002/0058204 A1 in view of Brock et al. patent no. 6,444,408.

Khojasteh teaches an underlying composition for a multilayer lithographic processes wherein the underlayer is coated on a microelectronic substrate and comprises a resin having alicyclic groups and chromophore groups wherein the chromophore groups are phenyl groups as shown in polymer (III) or polymer (VI) below as in claims 1 and 2.



Chromophore groups other than phenyl are taught in section 44 are non-fused aromatics such as phenol or fused aromatics such as anthracene, thus making obvious the limitation of claim 4.

The substrate may be exposed to 157 nm imaging radiation as in claims 23 and 71 (section 58).

As shown above, both polymers III and VI have isobornyl groups as in claim 5.

As to new claims 62 and 66 Khojasteh teaches the underlayer has a thermal acid generator (section 62).

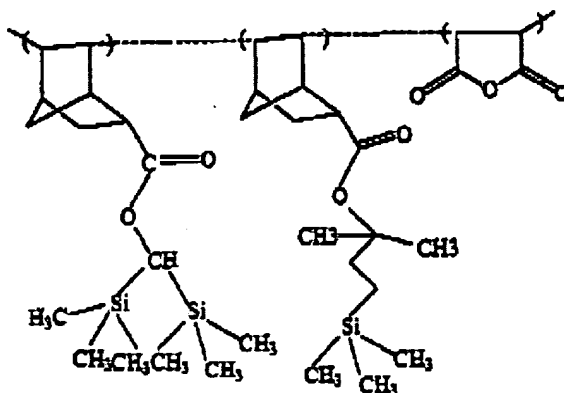
Art Unit: 1752

In sections 71 and 82 Khojasteh teaches the preferred resist for overcoating the underlayer composition is a silicon containing resist and in section 82 it states the underlayer comprising polymer (III) was coated with a silicon containing resist as taught in the copending application 09/514,212 which is Brock et al. Khojasteh does not teach the resist has a photoactive component.

*[0082] The above polymer was formulated into a planarizing underlayer composition by combining with 4.75 wt. % of an acid generator di-(t-butyl) iodonium perfluorobutane sulfonate (PFBS) in PMA solvent. A solution was coated to 5000 .ANG. and baked at 225.degree. C. for 2 minutes prior to resist coating with a silicon-containing resist described in copending application Ser. No. 09/514,212.*

The silicon-containing resist of Brock is taught in example 11. The silicon-containing polymer is shown below and has silicon groups, alicyclic groups and acid labile groups (Figure 7) as in new claims 63-65, 68-70; the underlayer is crosslinked as in claim 67 (section 68). The composition also has a photoacid generator as a photoactive component.

It would have been obvious to one of ordinary skill in the art to use the resist composition of Brock as the resist composition in Khojasteh with a reasonable expectation of obtaining a substrate for making integrated circuits because Khojasteh teaches the underlayer should be used with the resist compositions taught in Brock having copending application ser. no. 09/514,212.



Art Unit: 1752

**Claim Rejections - 35 USC § 102**

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 54,61 are rejected under 35 U.S.C. 102(b) as being anticipated by Sinta et al. patent no. 5,886,102.

In col. 7, lines 6-8, Sinta teaches an underlayer antireflective coating (ARC) for use with a photoresist and exposure to deep UV, 100-300 nm. The coating comprises a resin having an anthracene group, (Fig. 2, formula I, shown below), and a resin having a phenol group ( Fig. 2, col. 7, lines 16-23, shown below). The composition may have a thermal acid generator as in claim 61. (col. 8, lines 29-35).

Using the ARC with an Si containing photoresist imaged at under 200 nm is an intended use of the ARC and, thus, is given little weight as the claim is directed to a composition not a method of using the composition.

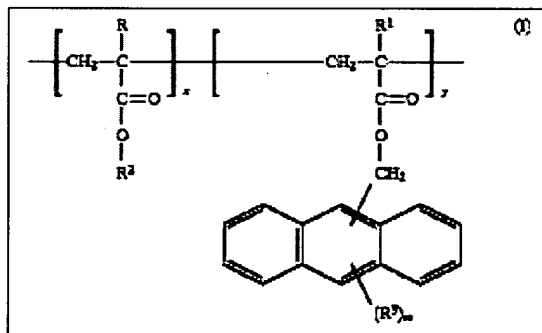


Fig.1, formula (I) 1

Art Unit: 1752

The antireflective compositions of the invention also may contain resins that do not include polycyclic chromophore units as a co-resin present with resins having polycyclic chromophore units, or as the sole resin of the ARC binder component. For example, phenolic resins such as the poly(vinylphenols), novolaks and other resins described below as photoresist resin binders could be employed in resin binder components of ARCs of the invention.

Fig.2, col.7, lines 16+ 1

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosemary E. Ashton whose telephone number is 571-272-1326. The examiner can normally be reached on Mon-Fri, 11:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1752

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rosemary E. Ashton  
Primary Examiner  
Art Unit 1752

August 30, 2005

**ROSEMARY ASHTON  
PRIMARY EXAMINER**